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IN THE APPLICATION

OF

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FOR A

WINDSHIELD WASHER MACHINE

# WINDSHIELD WASHER MACHINE

## BACKGROUND OF THE INVENTION

### 1. FIELD OF THE INVENTION

5 The present invention relates to window washers. More specifically, the invention is a windshield washer incorporating a reciprocating squeegee head for cleaning a vehicle's windshield.

### 2. DESCRIPTION OF THE RELATED ART

10 Vehicles are used, for example, as a personal form of transportation and to haul goods. Vehicles are exposed to various driving conditions and often get dirty. Windshields are particularly susceptible to getting dirty and thence detrimentally impact on driver visibility. It is important to  
15 maintain good visibility through a vehicle's windshield to avoid unnecessary risk to the driver, his passengers and other road users.

Cleaning a vehicle's windshield can present challenges. For example, a windshield covered with insect remains presents a challenge. In addition, some vehicle operators experience

difficultly performing physical tasks such as cleaning a windshield. For example, people with troublesome arthritis may find it particularly hard to clean a dirty windshield. A healthy driver can also face difficulties when cleaning a windshield spattered with hardened and dried out insect remains. Thus, there is a need for an apparatus adapted to assist a vehicle operator in the task of cleaning a vehicle's windshield.

U.S. Patent No. 6,062,491, issued May 16, 2000 to Hahn et al, describes a cleaning device for a window and headlamp cover of a motor vehicle. The '491 device has two washer nozzles that produce strip-shaped spraying regions on the window or headlamp cover. The '491 spraying regions are arranged one above the other to cover a large region of the window or headlamp cover. The '491 device does not provide a reciprocating cleaning action to boost the removal of insect remains from a windshield.

U.S. Patent No. 5,363,528, issued November 15, 1994 to R.D. Brock, describes a window washing tool that comprises a squeegee head having a body, an elongated handle attached to the squeegee body, a pair of opposed wiping bars, and a means to move the wiping bars between a retracted position and a forward extended position. The '528 device does not teach or suggest a rigorous reciprocating action to remove hardened insect remains from a vehicle's windshield.

U.S. Patent No. 6,009,592, issued January 4, 2000 to E. Habba, describes a linearly reciprocating wiper apparatus for wiping a non-planar window. The '592 apparatus comprises a first and second track members and a drive wheel assembly that includes at least one motorized drive wheel which engages the tracks. In view of the requirement for tracks and a motorized drive wheel system the '592 device is dedicated to cleaning a window in close proximity to the tracks. Thus, the '592 apparatus cannot be used, for example, to clean a line of cars with dirty windshields. Thus, there is a need for an apparatus that can clean windows, such as windshields or rear windows, on different cars.

European patent application number EPO0074600, published March 23, 1983 to B. Herbert, describes a flatbed-printing machine comprising a reciprocating doctor blade arrangement. While the Herbert patent describes a reciprocating doctor blade there is no teaching or suggestion of combining the reciprocating doctor blade with a cleaning fluid suitable for cleaning a windshield. Instead, the Herbert patent teaches away from the present invention by exploiting the reciprocating doctor blade for making it possible for a sheet to be printed on virtually up to the edge of the sheet and for excellent register to be guaranteed even for larger printing formats.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed. Thus a windshield washer machine solving the aforementioned problems is desired.

#### SUMMARY OF THE INVENTION

The present invention is directed to a washing machine especially adapted to substantially clean a vehicle window such as a vehicle's windscreen. In a preferred embodiment the washing machine is a windscreen washing machine. The washing machine comprises a power supply, a cleaning fluid supply, and a reciprocating squeegee tool. The reciprocating squeegee tool comprises a reciprocating means, a squeegee head, and a spraying means. The squeegee head is connected to the reciprocating means that induces a reciprocating action in the squeegee head wherein the squeegee head is repeatedly moved between a first position and a second position. The spraying means is connected to the cleaning fluid supply and located proximate to the squeegee head thereby allowing the spraying means to spray cleaning fluid in an area proximate to the squeegee head.

Accordingly, it is a principal object of the invention to provide a washing machine adapted to clean a vehicle.

It is another object of the invention to provide a windscreen washing machine.

It is a further object of the invention to provide a windscreen washing machine that operates for a predetermined time period.

It is an object of the invention to provide improved elements and arrangements thereof for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an environmental, perspective view of a windshield washer machine according to the present invention.

Fig. 2A is a perspective view of a reciprocating squeegee tool according to the present invention.

Fig. 2B is an exploded view of the reciprocating squeegee tool of Fig. 2A.

Fig. 3 is a partially exploded view of a money-operated cleaning station.

Fig. 4 is a front view of a control system used to operate the money-operated cleaning station of Fig. 3.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is directed to window washers. More specifically, the invention is a windshield washer incorporating a reciprocating squeegee head for cleaning a vehicle's windshield.

Fig. 1 shows an environmental, perspective view of a first embodiment of a windshield washer machine 100 according to the invention. In one embodiment of the invention, the windshield washer machine 100 comprises a reciprocating squeegee tool 120, a power supply line 140, such as a re-coiling power line, to supply power to the reciprocating squeegee tool 120, cleaning fluid delivery tubing 160, and a money operated cleaning station 180 in operable communication with the reciprocating squeegee tool 120. The cleaning station 180 comprises at least one housing 183 and a money-receiving member 188. It should be understood that the cleaning station 180 may comprise of a single housing or a housing subdivided into sections such as the at least one housing 183 and an additional housing 186.

As used herein, it will be understood that the money-receiving member 188 is preferably adapted to receive coins. Alternatively, the money-receiving member 188 is adapted to handle paper currency such as American dollar bills and European paper money. The money-receiving member 188 can also be adapted to handle, for example, credit cards, debit cards, and tokens. Money-receiving members in the form of paper currency and coin receiving mechanisms that can calculate and dispense change are well known; vendors of money receiving members are found, for example, in trade journals, in yellow pages, and on the world wide web, e.g., at URL: [http://www.refurbishedvending.com/bill\\_validators.html](http://www.refurbishedvending.com/bill_validators.html).

Still referring to Fig. 1, a vehicle operator 200 is shown using the reciprocating squeegee tool 120 to clean a vehicle 205 and more particularly the vehicle's windshield 220. The windshield washer machine 100 is adapted to enable a vehicle operator 200 to thoroughly clean a vehicle's windows such as a windshield 220 though the device 100 could also be used to clean, for example, a vehicle's rear window and lights such as a vehicle's signal lights 240, headlights 260, and the vehicles side-windows 265.

Figs. 2A and 2B are respectively a perspective and an exploded view of a reciprocating squeegee tool 120 according to



the present invention. The reciprocating squeegee tool 120 comprises a handle 270 defining a housing 280 having a first 300 and second 320 opposite ends, and a mechanical reciprocator 340 located in the housing 280. The reciprocating squeegee tool 120 further comprises a hollow elongated shaft 380 having a proximal end 400 and a distal end 420, wherein the proximal end 400 is connected to the second opposite end 320 of the housing 280. A section of the cleaning fluid delivery tube 160 is wrapped around the shaft 380 and terminating in a sprayer member 560.

The reciprocating squeegee tool 120 still further comprises a squeegee head 440 defining a rod connector 460. An elongated rod 480 with opposite ends 500 and 520 is located inside the hollow elongated shaft 380, wherein opposite end 500 is adapted to operably connect to the mechanical reciprocator 340 and the other opposite end 520 is adapted to connect to the rod connector 460 of the squeegee head 440. One end 540 of the cleaning fluid delivery tube 160 terminates in the sprayer member 560. The sprayer member 560 comprises a hollow shaft 565 that accommodates the tube end 540. The tube end 540 may be located inside the shaft 560 or extend therefrom as shown in Fig. 2A. It should be understood that the sprayer member 560 might take any suitable form such as a spray nozzle connected to the tube end 540.

Still referring to Figs. 2A and 2B, the mechanical reciprocator 340 comprises an electric motor 345 that is energized by a power supply 660 (see below). The motor 345 may receive power via a re-coiling power line such as a 14-gauge re-coiling power line. However, the mechanical reciprocator 340 may be powered by a compressed air supply.

In normal operation cleaning fluid 600 is directed along the delivery tube 160 to the sprayer member 560 and sprayed on an area 215 of windshield 220 proximate to the squeegee head 440. The spray member 560 may also spray cleaning fluid onto the squeegee head 440.

In more detail, the mechanical reciprocator 340 induces a reciprocating action in the squeegee head 440 such that the squeegee head 440 is repeatedly moved between a first position 442 and a second position 444. The induced movement in the squeegee head 440 combined with the cleaning fluid sprayed from the spray member 560 collectively cleans a vehicle's windshield 220. It should be understood that the reciprocating squeegee tool 120 could be used to clean any vehicle window such as a vehicle's side 265 and rear windows. In addition, the reciprocating squeegee tool 120 can be used to clean other parts of a vehicle such as, but not limited to, side mirrors, lights, body surfaces such as car door surfaces, and wheels.

The reciprocating action provided by the mechanical reciprocator 340 is well understood and described, for example, in U.S. Pat. No. 6,264,211 issued July 24, 2001 to R. Granado. U.S. Pat. No. 6,264,211 is hereby incorporated by reference in its entirety. The handle 270, which includes the mechanical reciprocator 340, is available from vendors on the World Wide Web such as Makita Industrial Power Tools (e.g., see URL: <http://www.toolpeddler.com/4390d.htm>).

Fig. 3 is a partially exploded view of the money operated cleaning station 180. The cleaning station 180 comprises housings 183 and 186, and a money-receiving member 188. The housings 183 and 186 can be combined in a single housing; alternatively, the housings 183 and 186, and the money-receiving member 188 can be combined in a single housing.

Still referring to Fig. 3, a cleaning fluid container 580 is located inside housing 183. The container 580 is used to store a body of cleaning fluid 600; the container 580 can be of any suitable volume such as a 55-gallon cleaning fluid drum. A hose 620 carries the cleaning fluid 600 to a pump 640 (see Fig. 4) located in housing 186.

Fig. 4 shows an interior view of the housing 186. A power supply 660 is connected to the pump 640 and the reciprocating squeegee tool 120 via the power supply line 140. The pump 640

pumps cleaning fluid 600 up hose 620 and thence along cleaning the fluid delivery tubing 160 in response to power supplied by the power supply 660 to the pump 640. A timer 680 is connected to the money-receiving member 188 via line 700, and to the power supply 660 via control line 720. The timer 680 is configured to allow the power supply 660 to deliver power to the reciprocating means 340 and the pump 640 for a predetermined time in response to a predetermined amount of money deposited in the money-receiving member 188. The predetermined time can be set to any suitable duration of time. The predetermined time is preferably set to allow sufficient time for an average vehicle operator 200 to clean a vehicle's window such as a windshield 220, but preferably not sufficient time to allow the average vehicle operator to clean an entire vehicle 205 to decrease wear and tear on the reciprocating squeegee tool 120. The predetermined time could be based on the amount of money deposited thereby offering the vehicle operator 200 a range of power-on times to enable the operator 200 to clean the windshield 220 and other parts of the vehicle 205 such as the vehicle's side windows 265.

It should be understood that the power supply 660 might be configured in a multitude of ways without detracting from the spirit of the present invention. For example, the power supply 660 provides an electric current at a voltage suitable to energize the motor 345. The power supply 660 might be

configured to output alternating current (AC) or direct current (DC). The power supply 660 might be adapted to step down a mains input voltage and thereby supply a lower AC voltage to the motor 345. Alternatively, the power supply 660 might be adapted to convert mains AC into low voltage DC and thereby supply a low voltage DC to the motor 345. In another configuration the power supply 660 might only supply power to the motor 345, wherein the pump 640 is configured to accept power directly from the AC mains and further wherein the timer 680 is configured to directly cut or allow power to the pump 640. Thus, the exact arrangement of the power supply 660, timer 680, and the pump 640 may vary considerably without detracting from the spirit of the present invention.

If the output from the power supply is AC it is important that the motor 345 is rated to handle AC. Alternatively, the power supply 660 could output DC in which case it is important that the motor 345 is rated to handle DC. Alternatively, the power supply 660 may take the form of an internal battery inside the handle 270.

In a further embodiment of the present invention a method is provided to clean a vehicle window, comprising the step of cleaning a vehicle window using a reciprocating means attached to a squeegee head. The reciprocating means is adapted to be driven by an electric current or by pressurized air delivered

from a reservoir of compressed air. In this method a cleaning fluid might also be applied to the vehicle window such as the vehicle's windscreen. Alternatively, the cleaning fluid may be applied to the squeegee head or window.

5        It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.